

Remarks:

Prior to entry of this Amendment, claims 1-26 and 33-36 remained pending in the application. Claims 1, 2, 6, 11, 18, 19, 21 and 22 stand rejected under 35 U.S.C. §102(b) based on Slysh (US 5,147,680). Claims 1-26 and 33-36 stand rejected under 35 U.S.C. §103(a) based on Drazl (US 6,565,927) in view of Slysh. Applicants respectfully traverse these rejections.

By this Amendment, applicants have amended claims 1, 2, 10, 11, 19 and 21. Claims 6 and 22-24 have been cancelled without prejudice.

Rejections Under 35 U.S.C. §102(b)

As noted above, claims 1, 2, 6, 11, 18, 19, 21 and 22 stand rejected under 35 U.S.C. §102(b) based on Slysh. In support of this rejection, the Examiner has indicated that Slysh teaches roughening of a substrate by irradiating the surface with a laser in order to increase the adhesion of a layer to be applied. The Examiner further asserts that Slysh teaches use of a mask to control the areas of ablation.

While applicants agree that Slysh discloses use of a maskant on a workpiece, applicants note that the purpose of the laser beam is "to disintegrate the excess maskant" and to "shape[] the edges of the maskant" (column 2, lines 4-18). Thereafter, the workpiece is chemically milled to produce ribs on the workpiece (column 5, lines 2-6; Fig. 5). Moreover, Slysh expressly describes use of "circulating air currents [that] are directed to entrain and remove maskant volatile product and debris generated by the interaction of the laser beams with the maskant spray and deposited strip" (column 3, lines 29-32). Slysh thus specifically directs removal of debris from the workpiece so as to allow laser-disintegration and laser-shaping of the maskant.

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As amended, claim 1 recites:

A method of preparing a surface for adhesion, the method comprising:
 providing an initiator in the form of precursors of structures
 formed by ablation of a substrate which is configured to shadow a
 portion of a surface of the substrate;
 directing a laser toward the surface of the substrate to effect
 ablation of a non-shadowed portion of the substrate, forming structures
 on the surface of the substrate; and
 applying an adhesive to the surface of the substrate.

As noted generally above, Drazl does not disclose "providing an initiator in the form of precursors of structures formed by ablation of a substrate." In fact, Slysh does not even consider laser ablation of the substrate. Slysh proposes using lasers to disintegrate a maskant applied to a workpiece (substrate).

Slysh also fails to disclose debris (precursors of structures formed by ablation) that "shadow[s] a portion on a surface of the substrate." The Examiner asserts that an initiator that shadows a portion of the substrate is inherent to the process because "the art does not teach to blow the ablated material away from the substrate." However, contrary to the Examiner's assertion, Slysh specifically describes "circulating air currents" that remove any debris formed by ablation (column 3, lines 29-32). Slysh thus actually teaches away from the method recited in claim 1.

Slysh also fails to disclose "ablation of a non-shadowed portion of the substrate" so as to form structures on the surface of the substrate. As noted above, Slysh describes using lasers to disintegrate the maskant, not the workpiece underlying the maskant. In fact, as illustrated in Fig. 1 of Slysh, and as described in column 4, lines 42-49, laser energy is selected such that the workpiece absorbs laser energy. The laser thus does not "form[] structures on the surface of the substrate," as recited in claim 1.

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Finally, Slysh fails to disclose "applying an adhesive to the surface of the substrate." Slysh concerns nothing more than applying a maskant to a workpiece for subsequent chemical milling of the workpiece.

For at least the foregoing reasons, claim 1 is not anticipated by Slysh. Claim 1 thus is allowable over Slysh, and the rejection of claim 1 under 35 U.S.C. §102(b) should be withdrawn. Claims 2 and 6 depend from claim 1, and thus are allowable for at least the same reasons as claim 1.

Claim 10 recites:

A method of preparing a surface for adhesion, the method comprising:
directing laser radiation towards the surface of the substrate to effect ablation of the substrate and create ablation debris, the ablation debris having a higher ablation threshold than the surface of the substrate;
resetting the ablation debris on the substrate surface to shadow a portion of the surface from laser radiation;
further directing laser radiation towards the surface of the substrate at an intensity sufficient to cause ablation of the substrate, but not sufficient to cause substantial ablation of the debris, thereby forming structures on the surface of the substrate.

As noted generally above with respect to claim 1, Slysh fails to disclose "directing laser radiation towards the surface of the substrate to effect ablation of the substrate." Rather, Slysh discloses a laser beam configured "to disintegrate the excess maskant" and to "shape[] the edges of the maskant" (column 2, lines 4-18). There is no mention of "ablation debris having a higher ablation threshold than the surface of the substrate," or of "resetting the ablation debris on the substrate surface to shadow a portion of the surface from laser radiation," as recited in claim 10. In fact, Slysh expressly proposes disintegrating the maskant, and proposes use of "circulating air currents" that remove any debris formed by ablation (column 3, lines 29-32). This is contrary to the method of claim 10.

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Slysh also fails to disclose a laser having an "intensity sufficient to cause ablation of the substrate, but not sufficient to cause substantial ablation of the debris." Slysh fails to select laser intensity to ablate the substrate (but not the debris) because Slysh calls for removal of the debris. Although applicants specifically noted this distinction in the June 10, 2005 Amendment (see, page 10), the Examiner has not addressed this distinction.

For at least the foregoing reasons, claim 10 is not anticipated by Slysh. Claim 10 thus is allowable over Slysh, and the rejection of claim 10 under 35 U.S.C. §102(b) should be withdrawn. Claim 11 depends from claim 10, and thus is allowable for at least the same reasons as claim 10. Furthermore, since the Examiner failed to give applicants a full and fair hearing on the merits of claim 10 by addressing all of the language recited in claim 10, finality should be withdrawn. See, MPEP, §706.07.

Claim 18 recites:

A method of increasing adhesion of an adhesive to a substrate, the method comprising:

- directing a laser at a surface of a substrate to cause ablation of the surface and formation of ablation debris;
- adjusting the fluence of the laser between an ablation threshold of the substrate and an ablation threshold of the ablation debris;
- ablating the surface of the substrate;
- progressively covering the surface of the substrate with ablation debris to effect formation of raised structures on the surface of the substrate; and
- applying an adhesive to the surface of the substrate.

As noted generally above with respect to claims 1 and 10, Slysh fails to disclose "directing a laser at a surface of the substrate to cause ablation of the surface and formation of ablation debris." Rather, Slysh discloses a laser beam configured "to disintegrate the excess maskant" and to "shape[] the edges of the

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maskant" (column 2, lines 4-18). There is no mention of ablation of the surface of the substrate to form ablation debris. There also is no disclosure in Slysh of "applying an adhesive to the surface of the substrate," as recited in claim 18.

Slysh also fails to disclose "adjusting the fluence of the laser between an ablation threshold of the substrate and an ablation threshold of the ablation debris." As noted above, Slysh fails to adjust laser fluency to ablate the substrate (but not the debris) because Slysh calls for removal of the debris. Accordingly, Slysh fails to disclose "progressively covering the surface of the substrate with ablation debris to effect formation of raised structures on the surface of the substrate," as recited in claim 18. In fact, Slysh expressly proposes disintegrating the maskant, and proposes use of "circulating air currents" that remove any debris formed by ablation (column 3, lines 29-32). This is contrary to the method of claim 18.

For at least the foregoing reasons, claim 18 is not anticipated by Slysh. Claim 18 thus is allowable over Slysh, and the rejection of claim 18 under 35 U.S.C. §102(b) should be withdrawn. Claim 19 depends from claim 18, and thus is allowable for at least the same reasons as claim 18.

Furthermore, as noted above, the Examiner has failed to give any response to applicants' assertion (in the June 10, 2005 Amendment (see, page 10)) that Slysh does not disclose adjusting laser fluence between an ablation threshold of the substrate and an ablation threshold of the ablation debris. The Examiner thus has failed to give applicants a full and fair hearing on the merits of claim 18 by addressing all of the language recited in claim 18, and finality should be withdrawn. See, MPEP, §706.07.

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Claim 21 recites:

A method of eliminating interfacial failure between a first component and an adhesive in a print cartridge assembly, the method comprising:
directing a laser at a surface of a first component;
shadowing a portion of the surface of the first component with precursors of structures formed by ablation of the surface of the first component to form a high threshold ablation region and a low threshold ablation region;
adjusting the laser to ablate the low threshold ablation region at a rate faster than ablation of the high threshold ablation region in order to form structures on the surface of the first component; and
applying an adhesive to the surface of the first component.

As noted generally above with respect to claims 10 and 18, Slysh fails to disclose "adjusting the laser to ablate the low threshold ablation region at a rate faster than ablation of the high threshold ablation region in order to form structures on the surface of the first component." In fact, there would be no reason for Slysh to do so as Slysh calls for removal of the debris via "circulating air currents" (column 3, lines 29-32).

It also will be appreciated that Slysh fails to disclose "shadowing a portion of the surface of the first component with precursors of structures formed by ablation of the surface of the first component to form a high threshold ablation region and a low threshold ablation region." Rather, Slysh discloses a laser beam configured "to disintegrate the excess maskant" and to "shape[] the edges of the maskant" (column 2, lines 4-18). As noted, any resulting debris is removed by "circulating air currents." There is no mention of ablation of the surface of the substrate to form ablation debris. There also is no disclosure in Slysh of "applying an adhesive to the surface of the substrate," as recited in claim 21.

For at least the foregoing reasons, claim 21 is not anticipated by Slysh. Claim 21 thus is allowable over Slysh, and the rejection of claim 21 under 35 U.S.C. §102(b) should be withdrawn.

Rejections Under 35 U.S.C. §103(a)

As noted above, claims 1-26 and 33-36 stand rejected under 35 U.S.C. §103(a) based on Drzal in view of Slysh. In support of this rejection, the Examiner has indicated that Drzal teaches patterning of a substrate by irradiating the surface with UV light in order to increase adhesion of a layer to be applied. The Examiner asserts that the "water, ozone, organic particles taught in column 3, lines 28-45 reads on being the initiator."

The Examiner does not address Drzal's failure to disclose or suggest ablation of the surface, and does not address Drzal's failure to disclose an initiator in the form of precursors of structures formed by ablation of a substrate. Drzal discloses only photodecomposing of organic materials on the surface (column 3, lines 34-36). Drzal does not disclose ablation of the surface itself.

The Examiner, in fact, recognizes that Drzal fails to disclose ablation using a laser, and thus cites Slysh. Applicant maintains that the Examiner has failed to demonstrate that this combination is taught or suggested by the cited art (see, applicants' June 10, 2005 Amendment). Although the Examiner indicates that it would be obvious to employ the laser of Slysh in order to "reap the benefits of increased precision," there is no meaningful teaching in the references of the need for such precision in Drzal (which seeks only to roughen the surface of a substrate).

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Furthermore, despite the Examiner's indication that use of ablation debris as an initiator is "inherent to the process," there is no such ablation debris present in Drzal (which employs photodecomposed organic materials on the surface of a substrate). As noted above, Slysh also fails to settle ablation debris on the surface of the substrate (but rather calls for use of "circulating air currents" that remove any debris formed by ablation).

Drzal also fails to disclose a beam configured to effect ablation of a substrate, but not ablation debris from the substrate. As noted above, Slysh similarly fails in this regard.

Turning now to the particular claims, applicants focus initially on amended claim 1, which recites:

A method of preparing a surface for adhesion, the method comprising:
providing an initiator in the form of precursors of structures formed by ablation of a substrate which is configured to shadow a portion of a surface of the substrate;
directing a laser toward the surface of the substrate to effect ablation of a non-shadowed portion of the substrate, forming structures on the surface of the substrate; and
applying an adhesive to the surface of the substrate.

As noted generally above, Drzal does not disclose "providing an initiator in the form of precursors of structures formed by ablation of a substrate." In fact, Drzal does not even consider ablation of a substrate. Drzal proposes using UV light to photodecompose organic materials on the surface of a substrate. Slysh similarly fails in this regard in that Slysh discloses disintegrating a maskant applied to a workpiece (substrate).

Drzal also fails to disclose debris (precursors of structures formed by ablation) that "shadow[s] a portion on a surface of the substrate." The Examiner asserts that an initiator that shadows a portion of the substrate is inherent to the process

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because "the art does not teach to blow the ablated material away from the substrate." Applicants note, however, that Drzal does not even disclose ablation. Accordingly, there can not be any ablation debris. Slysh, specifically describes "circulating air currents" that remove any debris formed by ablation (column 3, lines 29-32). Slysh thus actually teaches away from the method recited in claim 1.

Drzal also fails to disclose "ablation of a non-shadowed portion of the substrate." As noted above, Drzal proposes using UV light to photodecompose organic materials on the surface of a substrate. There is no shadowed portion (or un-shadowed portion) affecting formation of structures on the surface of a substrate.

For at least the foregoing reasons, claim 1 is allowable over Drzal and Slysh, and the rejection of claim 1 under 35 U.S.C. §103(a) should be withdrawn. Claims 2-9 and 33-35 depend from claim 1, and thus are allowable for at least the same reasons as claim 1.

Claim 10 recites:

A method of preparing a surface for adhesion, the method comprising:
directing laser radiation towards the surface of the substrate to effect ablation of the substrate and create ablation debris, the ablation debris having a higher ablation threshold than the surface of the substrate;
resettling the ablation debris on the substrate surface to shadow a portion of the surface from laser radiation;
further directing laser radiation towards the surface of the substrate at an intensity sufficient to cause ablation of the substrate, but not sufficient to cause substantial ablation of the debris, thereby forming structures on the surface of the substrate.

As noted generally above with respect to claim 1, Drzal fails to disclose "directing laser radiation towards the surface of the substrate to effect ablation of the substrate." Rather, Drzal proposes using UV light to photodecompose organic

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materials on the surface of a substrate. There is no shadowed portion (or unshadowed portion) affecting formation of structures on the surface of a substrate. Correspondingly, there is no mention of "ablation debris having a higher ablation threshold than the surface of the substrate," or of "resettling the ablation debris on the substrate surface to shadow a portion of the surface from laser radiation," as recited in claim 10. Slysh expressly proposes disintegrating the maskant, and proposes use of "circulating air currents" that remove any debris formed by ablation (column 3, lines 29-32). Slysh thus teaches contrary to the method of claim 10.

Drzal also fails to disclose a laser having an "intensity sufficient to cause ablation of the substrate, but not sufficient to cause substantial ablation of the debris." Although the Examiner cites Slysh, Slysh also fails to disclose laser intensity to ablate the substrate (but not the debris). In fact, as noted herein, Slysh calls for removal of any such debris.

For at least the foregoing reasons, claim 10 is allowable over Drzal and Slysh, and the rejection of claim 10 under 35 U.S.C. §103(a) should be withdrawn. Claims 11-17 and 36 depend from claim 10, and thus are allowable for at least the same reasons as claim 10.

Claim 18 recites:

A method of increasing adhesion of an adhesive to a substrate, the method comprising:

- directing a laser at a surface of a substrate to cause ablation of the surface and formation of ablation debris;

- adjusting the fluence of the laser between an ablation threshold of the substrate and an ablation threshold of the ablation debris;

- ablating the surface of the substrate;

- progressively covering the surface of the substrate with ablation debris to effect formation of raised structures on the surface of the substrate; and

- applying an adhesive to the surface of the substrate.

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As noted generally above with respect to claims 1 and 10, both Drzal and Slysh (either alone or in combination) fail to disclose "directing a laser at a surface of the substrate to cause ablation of the surface and formation of ablation debris." Neither reference discloses ablation of the surface of the substrate to form ablation debris. Drzal and Slysh also both fail to disclose "adjusting the fluence of the laser between an ablation threshold of the substrate and an ablation threshold of the ablation debris." Accordingly, both references fail to disclose "progressively covering the surface of the substrate with ablation debris to effect formation of raised structures on the surface of the substrate," as recited in claim 18.

For at least the foregoing reasons, claim 18 is allowable over Drzal and Slysh, and the rejection of claim 18 under 35 U.S.C. §103(b) should be withdrawn. Claims 19 and 20 depend from claim 18, and thus are allowable for at least the same reasons as claim 18.

Claim 21 recites:

A method of eliminating interfacial failure between a first component and an adhesive in a print cartridge assembly, the method comprising:
directing a laser at a surface of a first component;
shadowing a portion of the surface of the first component with precursors of structures formed by ablation of the surface of the first component to form a high threshold ablation region and a low threshold ablation region;
adjusting the laser to ablate the low threshold ablation region at a rate faster than ablation of the high threshold ablation region in order to form structures on the surface of the first component; and
applying an adhesive to the surface of the first component.

Drzal and Slysh both fail to disclose "adjusting the laser to ablate the low threshold ablation region at a rate faster than ablation of the high threshold ablation region in order to form structures on the surface of the first component." It also will be appreciated that both Drzal and Slysh fail to disclose "shadowing a portion of the

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surface of the first component with precursors of structures formed by ablation of the surface of the first component to form a high threshold ablation region and a low threshold ablation region." In fact, there is no mention in either reference of ablation of the surface of the substrate to form ablation debris.

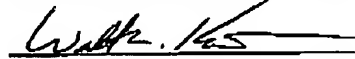
For at least the foregoing reasons, claim 21 is allowable over Drzal and Slysh, and the rejection of claim 21 under 35 U.S.C. §103(b) should be withdrawn. Claims 25 and 26 depend from claim 21, and thus are allowable for at least the same reasons as claim 21.

Conclusion

Applicants believe that this application is now in condition for allowance, in view of the above amendments and remarks. Accordingly, applicants respectfully request that the Examiner issue a Notice of Allowability covering the pending claims. If the Examiner has any questions, or if a telephone interview would in any way advance prosecution of the application, please contact the undersigned attorney of record.

Respectfully submitted,


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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being facsimile transmitted to Examiner E. Fuller, Group Art Unit 1762, Commissioner for Patents, at facsimile number (571) 273-8300 on November 14, 2005.



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